REMARKS / ARGUMENTS

Claims 1, 3-11 and 17 remain pending in this application. Claims 12-16 have been canceled without prejudice or disclaimer.

35 U.S.C. §112, first paragraph

Claim 11 has been amended to recite that the metal layer has face-centered cubic structure and contains Pd, Pt, Cu, or NiFe. This limitation is clearly supported by the specification at, for example, page 6, lines 14-22.

35 U.S.C. § 103

Claims 1 and 3-10 stand rejected under 35 U.S.C. §103(e) as being unpatentable over Carey et al (U.S. Patent No. 2003/0022023) in view of Shukh et al (U.S. Patent No. 6,818,330). These rejections are traversed as follows.

The claims have been amended to recite that the ferromagnetic layer is made from a soft magnetic material. This feature is not taught by the cited references. Allowable claim 12 has been rewritten in independent form as new claim 17.

According to the present invention, the exchange bias field can be largely applied to the first amorphous soft magnetic layer by forming the first amorphous soft magnetic layer via a ferromagnetic layer with high magnetic moment (see specification, page 6, lines 23-28). The ferromagnetic material is disclosed to be FeCo in the specification. This is well-known to be a soft magnetic material.

Furthermore, a soft magnetic material cannot bias the magnetic moment because of its low coercivity (Hc). The soft magnetic material can play a role of enhancing an exchange bias field from the antiferromagnetic layer without increasing the coercivity (Hc) of the 1st amorphous soft magnetic layer only when the soft magnetic material is formed on an antiferromagnetic layer.

On the other hand, Carey et al and Shukh et al disclose a layer of hard magnetic material that is used to bias the magnetic moment (see paragraph [0017] in Carey et al and page 2, lines 29-31 in Shukh et al). Since Carey et al and Shukh et al disclose a layer of hard magnetic material having a high coercivity (Hc), the (ferromagnetic) layer can bias the magnetic moment of the first amorphous soft magnetic layer by itself. And also this layer increases the coercivity (Hc) of the 1st amorphous soft magnetic layer because of its own high coercivity (Hc). However, even if the layer is formed on an antiferromagnetic layer, the layer cannot enhance an exchange bias field from the antiferromagnetic layer due to its high coercivity. Thus, the combination of the ferromagnetic layer having a high Hc and the antiferromagnetic layer does not work to apply an exchange bias field from the antiferromagnetic layer.

The combination of a ferromagnetic layer made from a soft magnetic material and an antiferromagnetic layer is superior to the case of an ferromagnetic layer made from a hard magnetic material, because the former enables the obtaining of a higher exchange bias field without increasing the coercivity of the first and second soft magnetic layers, as shown in Fig. 4. Meanwhile, the use of an ferromagnetic

layer made from a hard magnetic material increases, at a minimum, the Hc of the first amorphous soft magnetic layer, thereby degrading properties of the soft magnetic underlayer used for perpendicular recording media.

As described above, the advantages realized by the presently claimed invention cannot be realized by the structure disclosed by Carey et al and Shukh et al. As such, it is submitted that the pending claims patentably define the present invention over the cited art.

Conclusion

In view of the foregoing, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

By _____
Shrinath Malur
Reg. No. 34,663
(703) 684-1120